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Limited Liming for Clovers

Purdue University Cooperative Extension Service

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LIMITED LIMING FOR CLOVERS
Experimental Work Completed in 1940

Drilling a small amount of pulverized limestone with small legume seeds is termed "limited liming", or "light liming". Pulverized limestone in the fertilizer attachment and legume seed in the grass seed attachment, are delivered together through the grain tubes of an ordinary grain drill. When grown on land for the first time, INOCULATION OF ALFALFA OR SWEET CLOVER SEED IS ESSENTIAL.

Limited Liming Possibilities - One application of limited liming is less expensive than broadcasting large amounts. However, it will be necessary to light lime acid soils each time clover is seeded while one broadcast application may be sufficient for several clover crops. Often soil is so moist at the time legume seedings should be made that considerable mechanical difficulty may be encountered in drilling. Obviously, broadcasting a small amount of lime has little effect. Hydrated lime as a substitute for fine limestone carries only slightly more neutralizing value, will be more expensive, and more irritating to handle.

Trials in Indiana indicate that light liming may be a good practice on unlimed, slightly to moderately acid soils; on strongly acid soils limed some years previously; and as a supplement to heavy liming for first seeding of alfalfa or sweet clover on strongly acid soils. The combination was so superior to either one alone in establishing sweet clover that it is safe to predict that the first crop of alfalfa, sweet clover or red clover immediately following a heavy application might be greatly benefitted by some more lime drilled with the seed.

Kind and Amount of Pulverized Limestone to Use - It must be sufficiently dry to pass through the fertilizer attachment without bridging. It should contain a high proportion of fine material or dust. Stone of reasonable purity passing a 10-mesh screen, with one-half passing a 40 mesh screen is a good grade for light liming. This grade flows better than very fine ground material or "flour".

The amount to use depends upon its fineness and the degree of acidity of the soil. Experiments indicate that 300 pounds of 200-mesh stone or "flour" or 400 pounds of 10-mesh stone is required to establish stands of Sweet Clover on moderately acid soils. Twice this amount was necessary on strongly acid soil to establish red clover. Sweet clover requires more lime than red clover. With coarser stone containing less fine material, the amount should be increased.

Limited Liming is not a Substitute for Fertilizer - It may be a quick means of getting legume stands on medium acid soils (PH 5.5 - 6.0) but on strongly acid soils (PH 5.0) more thorough liming is needed. In three widely separated trials on medium acid soils, 200 pounds of fine lime, drilled in the row for corn, failed to increase yields. On two strongly acid soils (PH 5.0) 440 pounds of 200-mesh limestone, broadcast with each grain crop for 13 years, did not establish as good clover stands as one application of three to four tons 10-mesh stone. Three light applications were required before a fair stand of clover was obtained.

"ESTABLISHING SWEET CLOVER"- (EXTRACT FROM PROGRESS REPORT- PURDUE Cir. #242, May 1941)

This experiment was conducted on 4 tracts of land, in a rotation of corn, soybeans, oats, and wheat, with sweet clover intercrop drilled in the wheat. The soil was moderately acid, testing for the most part between PH 5.5 and PH 5.8. The purpose was to determine the effectiveness of light applications of agricultural limestone drilled with sweet clover seed, as compared to drilling the seed where previous heavier broadcast applications of lime had been made. Both inoculated and uninoculated seed were used with light applications of limestone.

"The heavier applications were broadcast and worked into the soil in preparing the land for wheat, during the first round of the rotation. The light applications were drilled with 10 pounds of seed each year in the wheat in late March. One year later, in early May, yield determinations were made of sweet clover top growth and roots to a depth of 10 inches.

RESULTS OF THE LIGHT VERSUS HEAVY LIMING EXPERIMENT

Treatment	Seed Inoculated?	Average, Four Crops: Estimated Stand Per cent	Number of plants per sq. Yard	Total green wt., tons per acre
No lime	Yes	34	41	1.42
400 pounds 30-mesh limestone drilled with seed	No	47	58	1.97
400 pounds 30-mesh limestone drilled with seed	Yes	71	95	4.09
2 tons 5-mesh limestone broadcast seed drilled	Yes	77	107	5.41
2 tons 5-mesh limestone broadcast and 400 pounds 30-mesh limestone drilled with seed	Yes	84	113	5.74

"Both inoculation and lime are necessary to establish sweet clover on medium acid soils of this type. Drilling 400 pounds of agricultural limestone with inoculated sweet clover seed has been very effective but heavier rates of liming appear to be necessary for best results."

1932 Experimental Results - At Lafayette, on moderately acid soil, good grade 10-mesh limestone, drilled with inoculated sweet clover seed in the spring on winter wheat at the rate of 365 pounds per acre, produced stands and growth equal to those produced by drilling inoculated seed on land receiving two tons of the same limestone preceding wheat seeding. Where the acidity was somewhat stronger, light liming produced only a little more than one-half the growth as did two tons broadcast. Dolomitic and calcium stones produced equal results. 235 pounds of the 200-mesh stone was not sufficient for best results. On moderately acid soil, light liming without inoculation or inoculation without liming produced unthrifty plants making only one-fourth the growth produced by the combination of light liming and inoculation.

At the Jennings County field, where three tons of limestone had been applied nine years previous, 300 pounds of 200-mesh stone drilled with inoculated sweet clover seed produced a full thrifty stand compared to a thin unthrifty stand without the additional lime. Similar results were obtained on the sand experiment field at Culver on land limed seven years previously at the rate of two tons per acre.

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